Short communication

Predicting alcohol and drug abuse in Persian Gulf War veterans: What role do PTSD symptoms play?

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Abstract

This study is a prospective longitudinal examination of symptoms of drug and alcohol use (SUD) and PTSD symptoms in 1006 veterans in the 6 years (T3) following return from the Persian Gulf War (PGW). Both alcohol and drug use at T3 were significantly correlated with demographic variables and all three types of PTSD symptoms (reexperiencing, avoidance, and arousal) as measured at T2. Hierarchical regressions were conducted to examine the self-medication hypothesis, which was supported for drug use but not for alcohol use at T3.
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1. Introduction

Several pathways discussed in the literature could explain the high rates of comorbidity between PTSD and SUD. Support has been found for the self-medication hypothesis, in which PTSD symptoms are hypothesized to have a causal role in the development of drug and alcohol abuse (e.g., Chilcoat & Breslau, 1998). However, examinations of the age of onset for PTSD symptoms and drug/alcohol use have resulted in mixed support for this hypothesis (e.g., Cottler, Compton, Mager, Spitznagel, & Janca, 1992). It is also possible that specific types of PTSD symptoms may differentially impact the development of SUD. Further

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complicating the picture is the possibility that pathways between PTSD symptoms and SUD differ for different substances.

This study longitudinally examined self-reported symptoms of PTSD and SUD in a large non-treatment-seeking population of veterans upon return from the Persian Gulf War (PGW) and over a 6-year period to test the self-medication hypothesis.

2. Method

2.1. Procedure

Within 5 days of return, 2949 military personnel returning from the PGW through Fort Devens, MA, in 1991 completed questionnaires (T1; see Wolfe, Brown, & Kelley, 1993). Follow-up assessments took place by mail at T2 (18 to 24 months) and T3 (6 years). Response rates were 78% for T2 and 44% for T3.

2.2. Participants

Demographic information for the T1 sample is reported elsewhere (see Erickson, Wolfe, King, King, & Sharkansky, 2001). The current sample consisted of 1006 veterans who completed measures of substance use and PTSD symptoms at T2 and T3. The sample was 91.2% Caucasian. At T3, the average age of participants was 38.1 years (S.D.= 9.2), most had completed some college (64.5%), the majority were married (66.7%), and most (54.4%) were still in the military or reserves.

2.3. Measures

2.3.1. PTSD symptoms
The Mississippi Scale for Combat-Related PTSD (Keane, Caddell, & Taylor, 1988) was completed at T2, with higher scores indicating more severe PTSD symptoms. Total symptoms and symptom cluster scores were examined separately (Erickson et al., 2001).

2.3.2. Substance use
At T2, the participants were asked to rate (1) how much of a problem they had with alcohol and with drugs at the time of deployment to ODS and (2) how much of a problem they have with alcohol and drugs currently. At T3, participants completed the Brief MAST (Pokorny, Miller, & Kaplan, 1972) and the DAST (Skinner, 1982).

3. Results

There was no difference in rates of SUD or PTSD symptoms at T2 between those who completed T3 assessment and those who dropped out. However, Completers were more likely

to be older, female, Caucasian, married, more educated, and a member of the Reserves or National Guard than Noncompleters were (see Table 1).

At T2, 12% of the participants reported they had an alcohol problem at deployment, and 15% reported a current alcohol problem. Two percent reported a drug problem at deployment, and 3% reported a current drug problem. At T3, the mean MAST score was 2.76 (S.D.=5.28) and DAST score was 0.33 (S.D.=1.32). Using a diagnostic threshold of 5, 14% met diagnostic threshold for alcohol problems and 2% of participants were considered to have a drug abuse problem.

MAST scores at T3 were negatively correlated with education and marital status and positively correlated with the three PTSD symptom clusters and alcohol problems at T2. DAST scores at T3 were negatively correlated with age and marital status and positively correlated with the three PTSD symptom clusters and drug problems at T2.

A three-step hierarchical regression was conducted to predict MAST scores. Years of education and alcohol abuse problems at T2 were predictive of MAST scores at T3. However, none of the PTSD symptom clusters from T2 predicted MAST scores after accounting for the other variables in the model (see Table 2a).

A three-step hierarchical regression was also conducted to predict DAST scores. A drug problem at T2 or prior to deployment and T2 PTSD arousal symptoms were predictive of T3 DAST scores in the final model (see Table 2b).

Table 1
Descriptive characteristics of completers compared with noncompleters

	Completers (N=1006)	Noncompleters (N=1943)
Age at T1	$M=32.2_a$, S.D.=9.2	$M=29.1_b$, S.D.=7.8
Gender		
Male (%)	89.9_a	92.9_b
Female (%)	10.1_a	7.1_b
Ethnicity		
Caucasian (%)	91.2_a	78.5_b
Black/African-American (%)	3.0_a	11.6_b
Hispanic (%)	2.4_a	4.6_b
Other (%)	3.5_a	5.2_b
Years of education at T1	$M=13.4_a$, SD=1.9	$M=13.0_b$, SD=1.7
Marital status at T1		
Single (%)	31.7_a	36.1_b
Married (%)	60.9_a	55.0_b
Separated/Divorced (%)	7.0_a	8.1_a
Military status prior to deployment		
Reserves/National Guard (%)	78.1_a	67.2_b
Active duty (%)	21.0_a	31.5_b

Values with different subscripts differ significantly at $p<.05$. Continuous variables were assessed with t-test, and dichotomous variables were evaluated using the chi-square statistic.

Table 2a

Final model prediction of MAST total weighted scores as a function of previous alcohol problems and PTSD symptomotology: hierarchical multiple regression analyses

Step and variable	B	S.E. B	β	R²	△R²
Step 1				0.01**	
Education	−0.176	0.081	−0.063*		
Partnered/not partnered	−0.176	0.310	−0.017		
Step 2				0.135***	0.124***
Alcohol problem at T2	1.666	0.289	0.200***		
Alcohol problem at deployment	1.955	0.311	0.208***		
Step 3				0.137	0.002
Arousal symptoms	−0.028	0.062	−0.018		
Avoidance symptoms	0.005	0.067	0.003		
Reexperiencing symptoms	0.074	0.066	0.047		

* $p \le .05$.
** $p \le .01$.
*** $p \le .001$.

4. Discussion

This longitudinal study of veterans returning from the PGW revealed low rates of substance problems, with 14–15% admitting alcohol problems and 2–3% admitting drug problems in the 6 years following their return from service. Alcohol use at T3 was significantly correlated with lower education, being single, previous alcohol problems, and all three types of PTSD symptoms measured at T2. Drug use at T3 was correlated with being younger, single, previous drug use, and all three types of PTSD symptoms measured at T2. These correlations were consistent with other studies of this comorbidity.

Table 2b

Final model prediction of DAST total scores as a function of previous drug problems and PTSD symptomotology: hierarchical multiple regression analyses

Step and variable	B	S.E. B	β	R²	△R²
Step 1				0.01**	
Age	−0.003	0.004	−0.021		
Partnered/not partnered	−0.131	0.074	−0.056		
Step 2				0.10	0.09**
Drug problem at T2	0.369	0.104	0.109***		
Drug problem at deployment	1.581	0.195	0.241***		
Step 3				0.11	0.01**
Arousal symptoms	0.021	0.014	0.06*		
Avoidance symptoms	−0.027	0.015	−0.074		
Reexperiencing symptoms	0.032	0.013	0.096		

* $p \le .05$.
** $p \le .01$.
*** $p \le .001$.

A hierarchical regression demonstrated that arousal symptoms of PTSD at T2 predicted drug use at T3 after controlling for prior drug use and demographic variables. This finding is consistent with prior research and the self-medication hypothesis, where drug use is hypothesized to be a coping strategy employed to reduce arousal symptoms of PTSD.

Interestingly, similar results were not found for predicting alcohol use in our sample after controlling for other variables. Thus, it appears that the relationship between PTSD symptoms and future alcohol problems is complex. The current findings are not explained by differential attrition of substance users versus non-substance-users. However, continued involvement in the military and use of self-report could have underestimated substance problems and/or biased results. These results are not consistent with the self-medication hypothesis and suggest that another model of interpreting the relationship between alcohol and PTSD use should be explored. One such model was discussed by Brown and Wolfe (1994), who posited that adapting a flexible coping strategy, rather than a single coping response (e.g., avoidance), may be the key to good health. Clearly, the association between alcohol use and PTSD symptoms is vital to deconstruct given the comorbidity of these problems.

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